Conservation Curriculum

IT'S A NEW YEAR!

Conservation Curriculum is a thematic K-12 curriculum insert prepared specifically to enhance *The Resource* and to provide a conservation education supplement to your current curriculum. Each issue will feature conservation information and activities, student copy pages, and teacher resources. Many of the activities featured are submitted by classroom teachers.

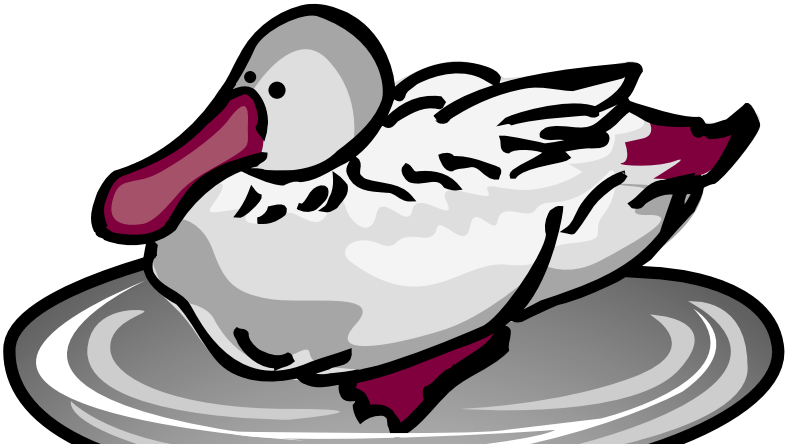
media loan list

Very Elementary Bats
Kindergarten-Fourth Grade/ 7 minute video
Children are naturally curious about bats. This still-image video will introduce them to the diversity of bats and help to dispel myths associated with these mammals.

JUNIOR DUCK STAMP CONTEST

Encourage Your Student Artists to Enter the Jr. Duck Stamp Competition!

Teachers (art teachers as well as teachers of any other discipline) are encouraged to have their students enter Missouri's Junior Duck Stamp and design contest. The competition is sponsored by the US Fish and Wildlife Service, the Missouri Department of Conservation, and the Greater Lake Area Arts Council. The top three entries from each class are eligible for the statewide competition. Teachers will receive certificates for each student who participates (even if they're not in the top three). Entry deadline is **March 15**. Request an entry packet with all the details by writing to: Jr. Duck Stamp Entry Packet, Distribution Center, MDC, PO Box 180, Jefferson City, MO 65109



outside in

Each issue of "Conservation Curriculum" will have a component that can serve as a teacher guide to Outside In. Outside in is a student level insert to the *Missouri Conservationist* magazine. Issues come out in August, November, February and March. Issues match up as follows:

August *Outside In*
October Conservation Curriculum

November *Outside In*
December Conservation Curriculum

February *Outside In*
February Conservation Curriculum

May *Outside In*
April Conservation Curriculum

Schools can request classroom sets (30 copies) of *Outside In* for up to 8 sets or 240 copies per school. Sets are sent to school librarians encouraging teachers to share classroom sets. (To figure the number of sets per school, we ask that teachers plan on 1 copy serving 5 students.) You can order by writing: Missouri Department of Conservation, "Missouri Conservationist" magazine, PO Box 180, Jefferson City, MO 65102-0180.

BATS-Myths & Mysteries

PreK-4

Objectives:

After completing this activity, students will be able to:
1. Describe the main characteristics of bats.
2. Identify a minimum of two benefits of bats to people and the environment.
3. Explain a minimum of three myths associated with bats.

Materials:

drawing paper, crayons, scissors, tape or tacks, poster or photos of bats (optional), bat video (optional)

Background:

Bats are some of the most interesting and least understood animals in the world. Numerous myths are attributed to bats. The nearly 1000 different kinds (species) of bats account for one-quarter of all mammal species. They are the only flying mammals (flying squirrels glide rather than fly). Bats range in size from a mere 1/10 ounce (about the weight of a pencil eraser) to more than 2 pounds with wing spans of up to 6 feet. Missouri's largest bat, the hoary bat, has a wing span up to 16 inches. Missouri bats feed exclusively on insects by scooping them into their wing or tail membranes while in flight and transferring the insects into their mouths. Bats in other parts of the world feed on a variety of foods including fruit, nectar and pollen, and the flesh of animals. Vampire bats, which feed on the blood of warm-blooded animals (e.g., cattle), are found in Mexico, Central America and South America. Because insects are not available during winter months in Missouri, Missouri bats must either hibernate or migrate to warmer places. Missouri caves provide the warmth needed for hibernation. Repeated disturbance by humans can upset this hibernation, resulting in the expenditure of energy, subsequent loss of stored fat, and possible starvation.

Myth: Bats are flying mice.

Fact: While bats and mice are both mammals, bats are not rodents and, in fact, are more closely related to primates (monkeys, people).

Myth: Bats are blind...thus, the saying, "...as blind as a bat."

Fact: Bats have eyes and see quite well — they just don't see colors. Missouri bats primarily detect their prey (insects) through echolocation, a method whereby they emit high frequency sounds (sounds which humans cannot detect) which bounce off various objects (including insects), these sounds returning back to them. Echolocation enables them to accurately locate and catch (or avoid) these objects.

Myth: Bats can get tangled in your hair.

Fact: Bats can detect and avoid objects as fine as a single hair. They are, therefore, unlikely to become entangled in a mass of human hair!

Myth: Bats are dirty and carry rabies.

Fact: Bats are very clean, washing and grooming themselves like cats. Like all mammals, bats can get rabies but they rarely do. It must be remembered that bats are wild animals and should be left alone.

Myth: Bats are worthless animals.

Fact: Bats benefit humans by controlling insect pests that damage agricultural plants and annoy humans (e.g., mosquitos). Bats that feed on fruit help to disperse seeds. Nectar-feeding bats pollinate plants used by humans (e.g., bananas, avocados and cashews). Bacteria in bat guano (bat droppings) is useful in improving soaps, making gasohol and producing antibiotics and fertilizer. Many forms of cave life depend on the nutrients found in guano.

Procedure:

1. Ask students to explain what they know about bats. Write this on the board.
2. Show posters and photos of bats. Discuss the main features of bats.
3. Explain the meaning of a myth (something believed to be true but is not true or based in fact; often in the form of a story or characterization).
4. Discuss the various myths associated with bats. Present the facts that show these myths to be untrue.
5. Tell students that they are going to help create a display (bulletin board or wall mural) that shows the myths associated with bats on the left side of the display and the factual characteristics and benefits of bats on the other side. Allow them to use examples of all kinds of bats (those found in Missouri and those found world-wide).
6. Provide students with materials for creating display items. For representation of bat myths, they may draw: (1) a bat tangled in someone's hair; (2) a bat with no eyes, or; (3) a bat appearing to be dirty and rabid (foaming at the mouth). For factual representations, they may draw: (1) a bat with eyes and ears; (2) a bat with an insect captured in its wing; (3) a bat with an insect or piece of fruit in its mouth, or; (4) a bat sending out a high frequency sound which bounces off an object and returns to the bat's ears (can draw a wavy line to and from the object, the wavy line representing the sound emitted by the bat).
7. Have students, one-at-a-time, add their creations to the display, explaining what they are attempting to illustrate (factual characteristic, benefit or myth).
8. Show video from page C-1 (optional).

Extension:

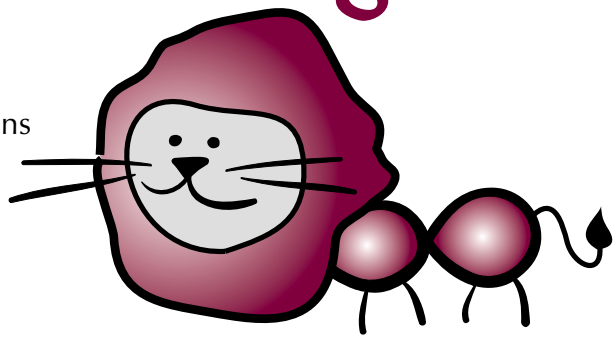
1. Have students use their bat creations to produce two mobiles...one illustrating the myths associated with bats, the other illustrating the factual characteristics and benefits of bats. Use the outline on these 2 pages as a pattern
2. Help students explore the Internet for information on bats. Information on Missouri bats may be found by typing "bats" on the "search" line found in the Web Site for the Missouri Department of Conservation: **http://www.conservation.state.mo.us/**. Other useful links may be found at: (1) http://members.aol.com/bats4kids/ (2) http://endangered.fws.gov/bats/links.htm

OUTSIDE in Guide

5-8

ANTLIONS-aka Doodlebugs

Objectives:



After completing this activity, students will be able to:
1. Describe the main characteristics of larval and adult antlions
2. Explain the feeding habits of antlions.
3. Identify a minimum of one benefit of antlions to people.
4. Explain a minimum of one myth associated with antlions.

Materials:

photos or other visuals of antlion larvae and adults, student handout with antlion drawings, dry sand, shoe boxes or other containers, popsicle sticks, modeling clay or other materials for fashioning antlions and their prey.

Background:

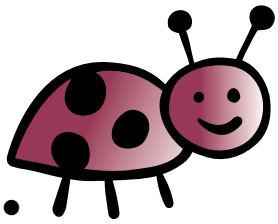
Antlions have captivated the interest of people for many centuries. The earliest descriptions treated antlions as mythical animals which possessed qualities of both ants and lions. Later on, some observers described antlions as small creatures that behave like lions towards ants and ant- like insects. Actually, they are fierce-looking predators that eat ants and other insects. A fully developed antlion larva is about 0.6 inches in length. Antlion larvae form cocoons which yield winged adults resembling damselflies. However, unlike damselflies, adult antlions have longer, prominent, clubbed antennae and, upon closer examination, exhibit a different type of wing venation. Adult antlions are rarely seen because they are most active at night.

The larvae of some antlions hide under bits of debris or wood where they attack passing insects. In sandy areas, some antlions dig shallow cone-shaped pits where they lie in wait at the bottom for an ant or other insect to venture in. The prey slides on the loose sand into the bottom of the pit. The waiting antlion seizes it with piercing-sucking mandibles which inject a paralyzing poison into the victim, allowing the antlion ample time to suck out its juices. If the prey manages to stop its slide down the side of the pit, the antlion accurately hurls a shower of sand at it. This inevitably causes the victim to lose its footing and continue its fateful journey to the bottom. The main benefit of antlions to people is their role in the control of the insect population.

During the pit-making process, the antlion creates spiral-shaped trails in the sand, hence the nickname, “doodlebug.” It builds its pit by pushing itself backward, first drawing a circle on the ground and, then, digging deeper and deeper, in a spiral fashion toward the center. During the process, the excavated sand or soil is thrown out by its head in a highly agitated manner. The pit- building takes only about a quarter-hour. It finishes by burying itself at the bottom with only its head, with opened jaws, exposed.

The antlion is a mysterious character, indeed. The longer the antlion goes without food, the larger it makes its pit. Another oddity is the effect of monthly biological rhythms, antlions digging larger pits at full moon, with a 29.5 day cycle in isolation.

Doodlebugs.....

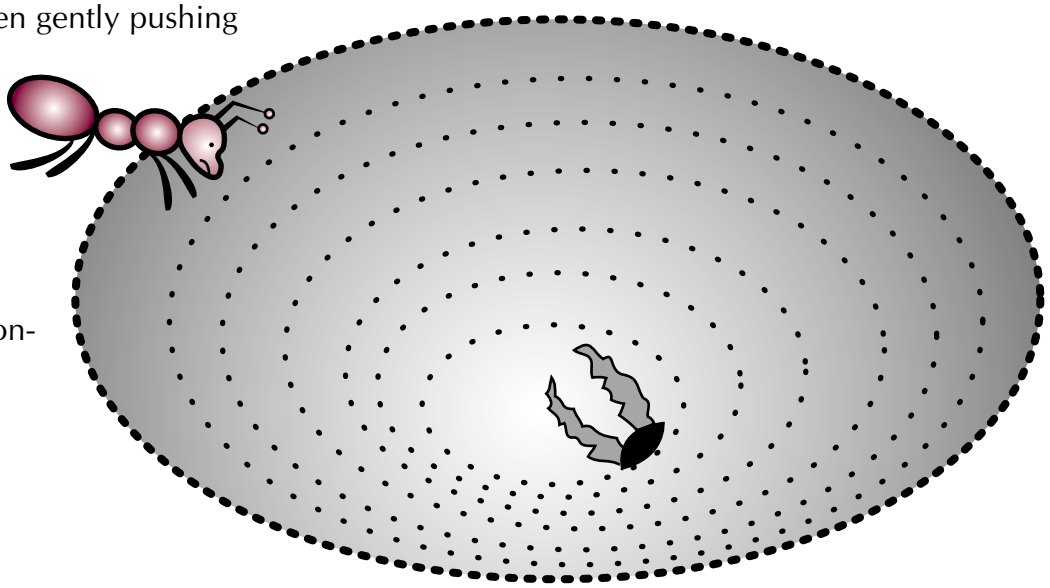


Procedure:

1. Ask students to describe how different kinds of animals obtain their food (e.g., bobcats track down and capture their prey with their claws; eagles snare their prey with talons; snakes seize and swallow their prey; crayfish feed on dead plant and animal matter; woodpeckers use their sharp beaks to search beneath tree bark for insects; spiders build webs to trap their prey). Ask them if they can describe any animals that ambush their prey (e.g., lizards which snatch their prey with long, sticky tongues; trap-door spiders; pit-vipers such as rattlesnakes; angler fish which has a filament extending out from its head, using it to lure its prey within reach).
2. Explain that students are going to investigate antlions—insects having a very unusual method for capturing their prey.
3. Provide students with copies of the antlion drawings.
4. Discuss the many interesting characteristics and habits of antlions.
5. Antlions can be collected by scooping out an entire pit being careful to dig deep enough so as not to crush the antlion. The sand can be sifted to expose the animal. The antlion may be kept in a container of dry sand with live ants released into the sand after the antlion has constructed its pit. After a couple of days of student observation, the antlion(s) should be returned to their original habitat. If there is concern over feeding live prey to antlions, students may use a puff of air or a slender blade of grass to stir the antlion into action.

Extension:

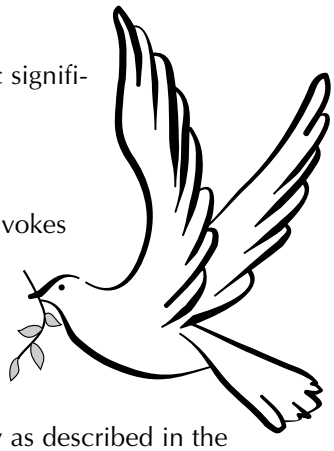
1. Have students search the Web for additional information on antlions. A very comprehensive and interesting site is found at: **http://www.antlionpit.com/antlions.html**.(includes short video action, antlions in culture, and myths attributed to antlions).
2. Form teams of two or three students per team. Challenge each team to set up a demonstration of the activities of an antlion using the materials provided. Each team will need a box of dry sand. One end of the popsicle stick can be fashioned into an antlion body with head and mandibles. Small prey species can be formed from the clay. They can use their "antlion" to build the pit, then gently pushing the "prey" over the edge of the pit. The antlion will snatch the prey with its mandibles, throwing sand on any prey species that fail to slide all the way to the bottom. The teams can be invited to present their demonstrations to the class.



cemeteries-
Links to the Past, Present & Future

9-12

Objective:
After completing these activities, students will be able to discuss the historic, cultural and academic significance of cemeteries.



Background:
The mention of cemeteries elicits different responses from different people. For some, a cemetery invokes images of ghosts, vampire bats, swirling plumes of fog, and other scary entities. For others, cemeteries are places of beauty and comfort. For students, cemeteries can refine their skills in several subject areas.

Procedure:
1. Ask students what they think of when the word "cemetery" is mentioned. Their answers will vary as described in the background information. Ask them why cemeteries elicit this response.
2. Explain that they are going to visit a cemetery to practice their skills in a number of academic areas. (Note: it is advised that if a private cemetery is to be visited, permission by the owners be obtained with an explanation of the activities to be conducted.) Stress the importance of conducting these activities in a respectful manner.
3. Following are some suggestions for activities which can be carried out in a cemetery. Some of these may be conducted or completed in the classroom. Students may be allowed to suggest some activities of their own.

Language Arts:
A. Obituaries: Bring some back issues of the local newspaper to class and have students read some of the more lengthy ones that describe some of the accomplishments of the persons who have died. Have students write their own obituaries as if they were to die: (a) this year; (b) 25 years from now, and; (c) 50 years from now. This exercise will encourage students to consider what they might like to do with their lives and how they would like to be remembered.
B. Epitaphs: An epitaph is an inscription on a tombstone commemorating or epitomizing the deceased person. Have each student copy one epitaph that they find especially interesting and briefly describe what they think this epitaph tells them about the deceased. Beneath this epitaph, write an epitaph (serious or humorous) for themselves, a friend or family member. Read their epitaphs to the class.
C. Experience Summary: Write a short essay on their feelings towards cemeteries before their visit to the cemetery and following their visit.

Math:
A. Average Life Span: Determine changes, if any, in the average life span of people during the past 200 years. One method is to calculate the average life span for ten randomly selected people that died during each one of the following time periods: (1) 1800-1850 (2) 1850-1900 (3) 1900-1950 (4) 1950-2000. Have students attempt to explain the possible reason(s) for the changes observed (e.g., an increase in the average life span over the years). Have them also devise a method for determining if there is a tendency for males or females to live longer.
B. Oldest/Youngest: Have students find:
(1) Name and age of the oldest person at the time of death.
(2) Name and age of the youngest person at the time of death.
(3) Date of the oldest grave (year of death).
(4) Date of the most recent grave (year of death).
C. Geometry: List the different geometric shapes of headstones (spheres, pyramids, rectangles, cylinders or columns, cones, cubes, etc.).

Science:

A. Earth Science: What is the composition of the headstones (limestone, sandstone, marble, granite)? Which kind of headstone material weathers the least? (granite, marble) the most? (sandstone, limestone) Based on the degree of weathering observed, which type of material is likely to be the most expensive? the least expensive?
B. Biology: Determine which kinds of trees, shrubs and flowers dominate the flora of the cemetery. What kinds of wildlife are observed? (squirrels, birds, butterflies, etc.) What is the relation of the abundance and variety of wildlife to the abundance and variety of plant life? Have lichens become established on any of the headstones? If so, on which kind of material (granite, marble, limestone or sandstone) are the lichens most commonly found?

Social Studies:

A. U.S. History: Is there evidence of any wars, tragedies and epidemics? Is there an indication of a person's national origin? How can you find additional information about a person's past history? (county records, Internet, obituaries and news articles from old newspapers on library microfilm, etc.).
B. Economics: Are there any clues to the wealth of the deceased and deceased's family? (size and quality of entombment)
C. Notables: Are there any famous people interred here (dignitaries, sports stars, artists, musicians, movie stars, etc.)? What was their cause of death?

Art:

A. Sketches: Have students sketch some of the more interesting designs and symbols found on the tombstones. Do these represent anything in particular? (doves-peace, willow trees-sorrow, flowers-beauty, etc.) How were the inscriptions, designs and symbols created? (laser, water-jet, sandblasting)
B. Rubbings: Permission to make rubbings should also be made prior to the field trip. Tombstones must be treated with great care and respect. Tombstone rubbings can be made with colored chalk or crayons on rice paper, butcher paper or chart paper. Prior to making the rubbings, cleaning of the tombstone with plain water (no detergents or other chemicals) may be necessary. Chalk rubbings can be protected with chalk spray or hair spray but the spray should be applied away from the tombstone.

Extension:

1. Create a one dimensional tombstone (out of cardboard or poster board) for a plant or animal that has become extinct. The face of the tombstone should include: (a) Common name and scientific name of the extinct species (b) Year that the species was declared extinct (c) designs and symbols (d) appropriate epitaph.